

IN THE CLAIMS:

1. (Currently Amended) A wireless audio signal ~~transmission system~~transmitter for transmitting an audio signal to a receiver, said transmitter comprising:

an analog signal source generating an analog audio signal of a desired audio bandwidth;

an analog signal sampling circuit responsive to said analog audio signal and generating a sequence of low bit weight digital words, wherein said low bit weight words comprise binary words having four or fewer bits per word;

wherein said sampling circuit samples said audio signal at a sampling frequency substantially greater than twice the highest frequency for said desired bandwidth of said audio signal;

a data encoder responsive to said series of low bit weight words, wherein said data encoder encodes said series of low bit weight words into an error control coded digital signal; and

a digital modulator responsive to said error control coded digital signal, ~~wherein~~ and said digital modulator generates a representation of a desired RF signal for transmission to a receiver based on the error control coded digital signal,

wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel.

2. (Currently Amended) The wireless audio signal transmitter ~~transmission~~ ~~system~~ of claim 1, wherein said analog signal sampling circuit generates a sequence of low bit weight digital words having one bit per word.

3. (Currently Amended) The wireless audio signal transmitter ~~transmission~~ ~~system~~ of claim 1, wherein said sampling circuit samples said audio signal at a sampling frequency substantially greater than forty thousand times per second.

4. (Currently Amended) The wireless audio signal transmitter ~~transmission~~ ~~system~~ of claim 1, wherein said sampling circuit samples said audio signal at a sampling frequency substantially greater than eighty thousand times per second.

5. (Currently Amended) The wireless audio signal transmitter ~~transmission~~ ~~system~~ of claim 1, wherein said analog signal sampling circuit comprises a delta-sigma modulator responsive to said analog audio signal modulating said audio signal into a series of low bit weight words.

6. (Currently Amended) The wireless audio signal transmitter ~~transmission~~ ~~system~~ of claim 1, wherein said digital modulator generates a first representation of a desired RF signal as an in-phase analog signal and generates a second representation of a desired RF signal as a quadrature analog signal, and

said wireless audio signal transmission system further including an IQ modulator having a first input responsive to said in-phase analog signal and said IQ modulator

having a second input responsive to said quadrature analog signal to generate an RF signal.

7. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 1, wherein said encoder comprises:

a scrambler responsive to said series of low bit weight words generating, through binary addition with a deterministic sequence of ones and zeros, a randomized sequence;

a forward error control encoder responsive to said randomized sequence to generate a plurality of coded output bits for each randomized sequence input bit; and

an interleaver responsive to said plurality of coded output bits and generating a shuffled sequence comprising said error control coded digital signal.

8. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 7, wherein said interleaver has a length of less than one millisecond when the data transmitted is transmitted at approximately one megabit per second.

9. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 7, wherein said forward error control encoder generates said plurality of coded output bits in multi-bit parallel words which are then input to a parallel to serial converter.

10. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 1, wherein said digital modulator generates an RF signal in an unlicensed frequency band.

11. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 10, wherein said modulator generates an RF signal in the unlicensed frequency band in the frequency range of 902 MHz through 928MHz.

12. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 10, wherein said modulator generates an RF signal in the unlicensed frequency band in the frequency range of 2400 MHz through 2483.5 MHz.

13. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 10, wherein said modulator generates an RF signal in the unlicensed frequency band in the frequency range of 5725 MHz through 5850 MHz.

14. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 1, wherein said analog signal source comprises a transducer.

15. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 14, wherein said transducer comprises a microphone.

16. (Currently Amended) The wireless audio signal transmitter transmission ~~system~~ of claim 15, further including:

an antenna responsive to said desired RF signal; and

a housing adapted to support said microphone, said delta-sigma modulator, said data encoder, said digital modulator and said antenna.

17. (Currently Amended) A method for transmitting a Radio Frequency (RF) signal corresponding to an analog audio or acoustic signal, comprising the method steps of:

(a) converting an analog audio or acoustic signal into a low bit weight digital signal comprising four or fewer bits per word;

(b) encoding said low bit weight digital signal with an error correction code to provide an encoded low bit weight digital signal;

(c) modulating an RF carrier signal with said encoded low bit weight digital signal to generate an encoded low-bit weight digital transmission signal; and

(d) transmitting said encoded low-bit weight digital transmission signal to a receiver via a wireless channel.

18. (Original) The method of claim 17, wherein converting step (a) comprises converting said analog audio or acoustic signal into a low bit weight digital signal by a delta sigma modulation method.

19. (Original) The method of claim 17, wherein converting step (a) comprises converting said analog audio or acoustic signal into a low bit weight digital signal having one bit per digital word.

20. (Original) The method of claim 17, wherein encoding step (b) comprises encoding said low bit weight digital signal with a convolutional error correction code to generate a data stream and then processing said data stream using bit interleaving methods to provide an encoded low bit weight digital signal.

21. (Original) The method of claim 17, wherein modulating step (c) comprises modulating an RF carrier signal with said encoded low bit weight digital signal using QAM quadrature amplitude digital modulation methods to generate an encoded low-bit weight digital transmission signal.

22. (Original) The method of claim 17, wherein modulating step (c) comprises modulating an RF carrier signal with said encoded low bit weight digital signal using QPSK quadrature phase shift keying digital modulation methods to generate an encoded low-bit weight digital transmission signal.

23. (Currently Amended) A wireless audio signal transmission system receiver for receiving a digitally modulated RF signal, said receiver comprising:

(a) a demodulator responsive to the a-digitally modulated RF signal and configured to generate a ~~digital~~-low bit weight digital signal by demodulating the digitally modulated RF signal; and

(b) a digital decimating low pass filter responsive to said ~~digital~~-low bit weight digital signal and configured to generate a pulse code modulation digital audio signal.

24. (Currently Amended) The wireless audio signal transmission system receiver of claim 23, further comprising:

(c) a digital to analog converter responsive to said pulse code modulation digital audio signal ~~digital filtered signal~~ and configured to generate an analog audio signal.

25. (Currently Amended) The wireless audio signal transmission system receiver of claim ~~24~~23, further comprising:

(c) a power sensing circuit responsive to said received digitally modulated RF signal and configured to ~~generate~~determine a received signal-to-noise ratio of the digitally modulated RF signal~~power level signal in response thereto~~.

26. (Currently Amended) The wireless audio signal transmission system receiver of claim ~~23~~25, further comprising:

(c) a power level feedback signal transmitter responsive to said ~~received power level signal~~determined signal-to-noise ratio and configured to transmit a power level feedback signal to the a-transmitter transmitting said digitally modulated RF signal

instructing the transmitter to increase or decrease transmission power based on the determined signal-to-noise ratio.

27. (Currently Amended) A wireless audio signal transmission system, comprising:

a transmitter, including

an analog signal source generating an analog audio signal of a desired audio bandwidth;

an analog signal sampling circuit responsive to said analog audio signal and generating a series of low bit weight words, wherein said low bit weight words comprise binary words having four or fewer bits per word;

wherein said sampling circuit samples said audio signal at a sampling frequency substantially greater than twice the highest frequency for said bandwidth of said audio signal, and;

~~a data encoder responsive to said series of low bit weight words, wherein said data encoder encodes said series of low bit weight words into an error control coded digital signal;~~

a digital modulator responsive to said ~~error control coded digital signal~~ series of low bit weight words, and wherein said digital modulator generates a representation of a desired RF signal for transmission to a receiver; based on said series of low bit weight words, and

wherein the desired RF signal containing the low bit weight words is transmitted wirelessly; and

a receiver in communication with said transmitter via at least one wireless channel
and receiving said desired RF signal, said receiver including
a demodulator responsive to said RF signal and configured to generate a
~~digital~~ low bit weight digital signal by demodulating said RF signal.

28. (Currently Amended) The wireless audio signal transmission system of claim 27, wherein said receiver includes a digital decimating low pass filter responsive to said ~~digital~~ low bit weight digital signal and configured to generate a pulse code modulation digital audio signal.

29. (Currently Amended) The wireless audio signal transmission system of claim 27, further comprising a digital to analog converter responsive to said low bit weight digital signal ~~digital filtered signal~~ and configured to generate an analog audio signal.

30. (Currently Amended) The wireless audio signal transmission system of claim 27, further comprising a power sensing circuit responsive to said received RF signal and configured to ~~generate~~ determine a received signal-to-noise ratio of said received RF signal ~~power level signal in response thereto.~~

31. (Currently Amended) The wireless audio signal transmission system of claim 30, further comprising a power level feedback signal transmitter responsive to said ~~received power level signal~~ determined signal-to-noise ratio and configured to transmit a

power level feedback signal to said transmitter, wherein said transmitter adjusts amplitude of said transmitted signal in response to said power level feedback signal.

32. (Currently Amended) The wireless audio signal transmission system of claim 27, further comprising a second receiver including a second demodulator responsive to said RF signal and configured to generate a second ~~digital~~ low bit weight digital signal.

33. (Currently Amended) A wireless audio signal transmitter transmitting an audio signal to a receiver~~transmission system~~, said transmitter comprising:

an analog signal source generating an analog audio signal of a desired audio bandwidth;

an analog signal sampling circuit responsive to said analog audio signal and generating a sequence of low bit weight digital words, wherein said low bit weight words comprise binary words having four or fewer bits per word;

wherein said sampling circuit samples said audio signal at a sampling frequency of substantially 2.8224megahertz;

a data encoder responsive to said series of low bit weight words, wherein said data encoder encodes said series of low bit weight words into an error control coded digital signal; and

a digital modulator responsive to said error control coded digital signal, ~~wherein~~ and said digital modulator generates a representation of a desired RF signal for transmission to a receiver based on the error control coded digital signal,

wherein the desired RF signal containing the encoded low bit weight words is transmitted to the receiver via a wireless channel.

34. (New) A wireless audio signal transmitter transmitting an audio signal to a receiver, said transmitter comprising:

an analog signal source converting an acoustic or audio signal into an analog electric signal;

a sampling circuit for over-sampling the analog electric signal and producing a sequence of low bit weight words as a digital representation of the analog electric signal, said low bit weight words having between one and four bits per word; and

a transmission circuit processing the sequence of low bit weight words to prepare the sequence of low bit weight words for transmission to a receiver via a wireless channel using an RF carrier and transmitting said RF carrier containing the processed sequence of low bit weight words to the receiver over the wireless channel.

35. (New) The transmitter of claim 34, wherein said sampling circuit comprises a delta-sigma modulator disposed in the transmitter, said delta-sigma modulator operably associated with a corresponding decimating filter disposed in the receiver.

36. (New) A wireless audio signal receiver receiving an audio signal from a transmitter having a delta sigma modulator, said receiver comprising:

a reception circuit receiving an RF signal from a transmitter over a wireless channel and processing the RF signal to extract a sequence of low bit weight words, said sequence of low bit weight words having a predetermined sampling rate; and

a decimating lowpass filter associated with the delta sigma modulator of the transmitter, said decimating lowpass filter decimating the sequence of low-bit weight words provided by the reception circuit to decrease the predetermined sampling rate.